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Mr. Rowland Glave Saunders, M.R.C.V.S.
Sheriff of Exeter.

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MAY, 1936

Biography

ROWLAND GLAVE SAUNDERS, M.R.C.V.S.

IT is with pardonable pride that we note the name of Mr. Rowland Glave Saunders, M.R.C.V.S., as having been elected to the high honour of Sheriff to the Mayor of Exeter. The Mayoralty of Exeter is the oldest in England, having been first created in 1237; and His Worship, together with our distinguished colleague, were presented to His Majesty the King at his first Levée held at Buckingham Palace in March.

Mr. Saunders graduated from the London College in 1895, and will be remembered by his fellow students, who were there at the time, for the earnestness with which he settled down to his college studies. Popular with his fellow students, in his quiet genial way he made many friends, and, before settling down in private practice in Cornwall, accepted a post as Lecturer in Veterinary Science at the Colonial College, Hollesley Bay, Suffolk; in which post he had been preceded by another equally popular lecturer, Major Heatley, O.B.E., F.R.C.V.S., of Woodbridge. For several years now Mr. Saunders has been out of actual practice, but he has never given up his love for the veterinary profession. As a Councillor of the City of Exeter he has done much to maintain its social status. His popularity with

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his brother Councillors is demonstrated by the positions in committees to which he has been elected, as at the present moment he is Chairman of the Committees for Maternity and Child Welfare, Public Assistance and City Hospital Management. He is also Deputy-Chairman of the City Mental Hospital.

The Royal Society for the Prevention of Cruelty to Animals has always had his influential support, and he is the Hon. Secretary of the Exeter, East and West Devon branch of the R.S.P.C.A. The animals of the county owe him a great debt of gratitude for his practical manifestations of interest in such questions as humane slaughtering, over-stocking of cows, and indeed all forms of cruelty. He is a strong supporter of the Exeter Animal Dispensary for the Poor, which is run under the auspices of the R.S.P.C.A.

In his work Mr. Saunders is well backed up by the earnest support of Mrs. Saunders, who is also fond of animals and equally keen on promoting any steps which lead to their welfare.

Editorial

IMPORTATION OF THERAPEUTIC SUBSTANCES ORDER OF 1936.

THE Ministry of Agriculture and Fisheries has recently issued an Order entitled "The Diseases of Animals (Importation of Therapeutic Substances) Order of 1936," which comes into force on July 1st, and is of special interest to members of the veterinary profession. By this Order every container of certain substances must be labelled with a description of its contents together with an indication of the place and country in which it was prepared. A list of these substances includes vaccines, sera, toxins, anti-toxins, antigens, salvarsan, extract of pituitary body, etc., and the Order also prohibits the landing in Great Britain of either live or dead contagious abortion vaccine except by special licence obtained from the Ministry of Agriculture. The use of live vaccine in this country will necessarily be prohibited, but may, under certain conditions, be used in Great Britain if prepared under proper scientific supervision in this country. Complete copies of the Order can be obtained from the Ministry of Agriculture and Fisheries, Whitehall Place, S.W.1, on application.

General Articles

MINERAL DEFICIENCY DISEASES IN FARM ANIMALS.*

By Prof. HENRY DRYERRE, Ph.D., M.R.C.S., L.R.C.P.

Physiology Department, Royal (Dick) Veterinary College, Edinburgh.

Historical and Biochemical.

ALTHOUGH a great deal is heard at the present time of deficiency diseases, the condition itself is by no means new. James Hogg, the Ettrick shepherd and poet, drew attention to it, in 1831, under the name of " Pine." In Florida, fifty-seven years later, Maxwell referred to a similar condition which he called " Salt-Sick " ; and in 1892 Bitting reported that in these animals the blood was pale and reduced in volume, hæmoglobin down to 30 per cent., spleen parenchyma atrophied, and heart flabby. Salt, bonemeal and sulphur therapy were ineffective. The condition was next noticed in New Zealand, when, in 1897, Gilruth referred to it as "Pining," and Park suggested that it was due to a deficiency in the soil. Believing the syndrome could be attributed to anæmia, he suggested the administration of carbonate of iron, but this treatment was not persisted in. In 1900 Aston took up the problem, and soils, pastures and waters were examined for toxic materials. None was found. A few years later he reported that blood analyses showed a deficiency of P, K and Fe. Phosphorus was suspected as being the deficient substance, and analysis of the pasture showed it to have a low P content. Super-phosphate top dressing was practised without benefit. In 1913 sulphate of iron was used as a surface dressing, and this met with a moderate degree of success. Finally, in 1916, Aston discovered that the administration of iron salts direct to the animals effected a cure. It was, incidentally, observed that in milch cows the addition of iron and ammonium citrate to the drinking water gave eight pounds more butter-fat per month. The condition outlined seems to be world-wide in its distribution, receiving names peculiar to each locality.

A form of Pine exists in the island of Tiree in the Inner Hebrides. In 1930 its investigation was initiated by the Animal Diseases Research Association, in conjunction with the Rowett Research Institute and the Macauley Institute for Soil Research. Grazing animals on certain parts of the island invariably causes Pine, but this can be prevented by changing over the animals periodically to " good " land. An iron deficiency was suspected, and an experiment was

* Lecture delivered at the Royal Veterinary College, London, May 7th, 1936, under the auspices of the University of London.

set up whereby young bullocks were grazed on the " pining " land and were supplied with minerals containing iron. Control animals on the same grazing received no minerals. The animals receiving the iron did not pine, the others did. Analyses of the soils showed that the pining area contained sixteen times as much CaO as the non-pine area, but that the latter contained two and a-half times as much iron as the former.

The condition has been found to exist also in eastern Ross-shire, where, until recently, there was a heavy death-rate in young stock. The average hæmoglobin content of the blood of affected animals was seven per cent. After six weeks' treatment with appropriate minerals the hæmoglobin rose to 10.3 per cent.

Observations of a somewhat similar nature have been made on a sheep farm on the northern slopes of the Cheviots. Examination of the blood of affected animals indicated a low R.B.C. count and a low Hb content. The colour index was below unity, all the factors pointing to a condition of chlorosis. The Animal Diseases Research Association, in collaboration with the East of Scotland College of Agriculture, carried through experiments whereby an iron compound was fed to the sheep on a pining area, in lieu of their being changed for a few weeks to " healthy " land. The iron treatment proved effective. Suggestions have been made that this condition is due to worm infestation. That that is unlikely is borne out by the fact that five months after the cessation of iron therapy the animals continue to thrive. Further, it is hardly conceivable that a worm infestation could be remedied by the simple procedure of changing the animals to "good " land for sixteen days and then returning them to their original grazings. And yet if this is done, no pining occurs.

A particular type of anæmia of great economic importance is that in pigs. Young pigs kept on milk for three to five weeks after farrowing will develop anæmia. A very high death-rate was caused by this in Schleswig-Holstein in 1890. In 1923 McGowan and Crichton drew attention to the anæmia produced by feeding pigs a diet deficient in Fe, and at that time they suggested that many of the obscure diseases previously reported in pigs might really have been anæmia. During the past 13 years intensive experimental investigation has been carried out with a view to determining its etiology, prevention and cure. It is most prevalent in pigs farrowed in early spring, but may be prevented entirely by smearing the sow's udder with a solution of $FeSO_4$ until weaning time. Alternatively, the udders may be smeared for the first four weeks and then 0.1 per cent. $FeSO_4$ added to the piglets' feeds. It has been reckoned that to keep a sow in condition, it requires .015 per cent. Fe in its feed.

In connection with the utilisation of Fe compounds, however, in these conditions, it is of interest to note the work of Underwood and Filmer in Australia, who have been curing what they call "Enzoötic Marasmus" by the administration of a crude natural Fe_2O_3 " Limonite." On fractionation, they conclude that the

active constituent is Co. 0.1 mg. Co per day for three months is sufficient to cure a sheep.

Of similar interest is a paper by Rigg and Askew detailing their further experiences in the treatment of Bush Sickness, in New Zealand, with HCl extracts of soil from " good " areas. Although the administration of ferri ammon. cit. prevented the onset of Bush Sickness during the first year of the sheep's existence, it failed to do so during the second spring, and by midsummer they were all dead. Drenching with " good " soil, however, enabled them to thrive and put on weight, and similar results were obtained with HCl extracts of this soil.

Whilst the efficacy of traces of Cu in enabling the animal to utilise Fe has been established, these recent observations open up new avenues for inquiry; and it may eventually be shown that not Fe *per se*, or Cu, but some hitherto unsuspected " impurity " in the Fe compound is the all-important factor.

Turning now to consider the question of Ca and P deficiency, because of their close chemical relationship it will be necessary to treat of them together.

More than 60 years ago Nessler drew attention (1873) to deficiencies of Ca and P in the diet as being responsible for excessive fragility of the bones in cattle, and 26 years ago Aston and Reid (1910) reported a similar condition observable in sheep. In more recent years the problem has been receiving great attention.

Deficient intake of Ca and P gives rise to lessened fertility, unhealthy offspring, poor coats, malformed and fragile bones, and poor milk yield.

In 1884 Hutcheon, South Africa, reported that the pasture grown on P deficient soil was itself deficient in P, and that this deficiency was aggravated during the dry season when the incidence of lambsiekte was at its greatest. The disease disappeared with the rainy season, which coincided with an increase in the P content of the pasture.

Acting on these observations, Borthwick (1896) fed bonemeal to cattle and was able to prevent lambsiekte. There then followed the exhaustive and stimulating investigations of Theiler and his co-workers, who demonstrated conclusively that both lambsiekte and styfsiekte were primarily due to P starvation. This created a depraved appetite in the affected animals, causing them to eat decaying animal carcases which, incidentally, were infected with Clostridium botulinum. Theiler has subsequently enlarged upon this work, and he is a protagonist of the view that deficiency of P as opposed to Ca is the factor responsible for the marked bony changes and the clinical symptoms. He even goes the length of stating that a simple acalcicosis is never likely to occur in cattle grazing on natural pastures. Whilst that may be true for cattle on the African veldt, evidence is accumulating to show that this is not universally applicable.

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Aston describes the unthriftiness and lessened fecundity of the cattle in areas where Ca is deficient in the soil, and compares them unfavourably with those grazing in the limestone districts. More positive evidence as to the effects of deficiency of Ca intake is given by Becker, Neal and Shealy (1933), who have published data relative to dairy herds in Florida. The grazings there are on acid, sandy, soils, low in available lime, which is reflected in a pasture with a low Ca content. Concentrates were fed in addition. The daily intake of these cows as regards Ca and P was 14.0 g. and 77.0 g. respectively. According to Kellner's figures the requirements of these animals were 36.0 g. Ca and 15 g. P. It is obvious that the animals were living on a deficient Ca intake, although the P intake was five times their requirements. The protein and carbohydrate content of the diet was ample, the soft tissues being well developed. Six out of the 34 animals incurred broken bones. There was no lethargy and no stiffness such as reported by Theiler in aphosphorosis.

Eventually it was decided, in the absence of a local source of a suitable quality of $CaCO_3$, to add bonemeal to the diet. This raised the daily Ca intake to 36 g. Twelve Jersey cows so treated each produced an average of 5 lb. more milk per day, and the breaking strength of their bones was increased by fully 50 per cent. Even the bones of those animals which had earlier suffered spontaneous fracture and which were now put on this ration, increased in breaking strength to above the normal. It is seen, therefore, that a deficiency either of P or of Ca can cause pathological changes in the bones, although these changes are dissimilar. In these animals there was no question of a deficiency of P, and the clinical records seem to indicate that the cattle were suffering from a straight acalcicosis. It might be contended that the wide ratio between Ca and P was the determining factor, but Theiler has stated that provided there is a *sufficiency* of both present, the ratio is of secondary importance. This has been borne out by recent workers. Lindsay, Archibald and Nelson (1931) showed that in dairy heifers, whether fed a ration high or low in Ca, the Ca : P *retained* was in the ratio 2 : 1. Those animals on the *low* Ca intake were receiving in their second year 2.5 g. Ca daily per 100 live weight, and they grew well and produced satisfactory calves. Again, Du Toit, Malan *et al.* (1933) fed two lots of calves on a ration sufficient in Ca and P. In one lot the ratio of Ca : P was 1.1 : 1.0, and in the other 5.5 : 1.0. They found no difference between the two groups up to one year of age.

Confirmation of these observations has also been obtained by the work of Meigs and his co-workers in feeding experiments extending over six years, and published last year. They followed the Ca and P intake, and their output through the milk and the calves born over a period of years. The animals were then slaughtered and the Ca and P content of the bodies determined. Whether the animals had been on a high or a low Ca intake, the ratio of Ca-P in the body was the same. They found, further, that animals persistently on a low

Ca intake showed a high coefficient of absorption (about 60 per cent.) and on a daily intake of 25 g. Ca, the Ca store in the body was not reduced below 85 per cent. of the normal. This increased efficiency in the utilisation of the Ca as the level of lime in the ration decreased had also been demonstrated by Hart *et al.* in 1932.

The bulk of evidence supports the view that a heavy milking cow secretes more Ca in the milk than it is able to assimilate in the diet. This means a steady drain from its bones, but Schmidt and Greenberg have recently shown that the milk yield is not reduced until 20 per cent. of the body Ca is lost. To maintain efficiency, the Ca intake/Ca milk should be in the ratio of 4 to 1. It is much easier to obtain a positive P balance than a positive Ca balance in high-yielding cows. The question of Ca metabolism has a very direct bearing on milk fever.

Since Greig and I published our communication in 1925, suggesting that this syndrome might be related to a hypo-functioning of the parathyroid glands, a considerable amount of work has been done in the determination of the blood Ca. Every case of M.F. examined showed a deficiency of this element in the blood, but no evidence has been produced to show that any deficiency of Ca exists in the skeletal tissues of the animal. Further, there is no conclusive evidence to show that the Ca intake of affected animals is excessively low. Efforts to prevent the onset of this condition, by supplementing the Ca in the ration even a considerable time before parturition, have met with only a moderate degree of success. Yet the parenteral administration of Ca compounds produces an almost immediate recovery.

A study of the syndrome variously known as Lactation Tetany, Herefordshire Disease and Grass Staggers, leads to the consideration of another deficiency, that of Mg. There is not sufficient evidence to establish that the condition is caused by a deficiency of Mg. in the ration, but every case so far examined has shown a deficiency of Mg in the blood of the affected animal. The problem of this disease is a baffling one, and investigations are at present proceeding at the Ministry's Laboratories at Weybridge, and at the A.D.R.A., Edinburgh. About four or five years ago my attention was drawn by a practitioner in Berwickshire and another in Herefordshire to a disease which was proving rapidly fatal to cattle. They submitted specimens of blood to me for analysis, and all showed a hypo-magnesæmia. The symptoms were those of hyperæsthesia, excitability and tetany. The employment of Mg therapy parenterally usually, but not invariably, brings about a rapid cure. The interest in these cases is their bearing on the metabolism of Mg. The incidence of Lactation Tetany is greatest when the animals are turned on to pasture in spring, after having been stall-fed. In the course of the investigations which I am at present conducting, a survey has been concluded of the blood Mg content in a herd of pedigree Ayrshires, over a period of one year. This gave an average figure of 2.49 mg. (St.D. 0.31) but

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the blood specimens taken *two days* after the cows had been turned out to pasture gave an average of 1.77 mg. This shows a fall of almost 30 per cent. from normal. Concurrently with these examinations experiments were being conducted on sheep to observe what effect the administration of Mg compounds had upon the blood Mg level. Magnesium compounds were administered, both subcutaneously and by the intravenous route, and blood specimens were withdrawn at intervals thereafter. An increase in the blood Mg was, of course, expected, but it was surprising to find that in all four sheep, after a few hours, the level of the Mg in the blood had fallen lower than that obtaining before the injections had been given.

On repeating the experiment, the phenomenon was again observed following three out of 12 injections in another batch of sheep. Using young bullocks as experimental animals, a similar condition was observed following four out of 14 injections. This raised the very interesting question as to what became of the Mg. Was it stored in the animal's hard tissues, or was it excreted? What was the factor which determined its removal from the blood? Was it possible that when the animal was put on to a fresh flush of grass there was an *increased* intake of Mg, instead of a deficiency as had been suspected? And did this increased Mg so disturb the metabolism of this element as to cause its elimination in excess from the blood? Tentative investigations have been made to try to solve this problem. Two Cheviot ewes were set up in metabolism boxes so that the intake and the output of Mg might be observed. After acclimatisation had been established each animal received, subcutaneously, 5 g. of $MgSO_4$, equivalent to 492 mg. of Mg. The next day the blood Mg of one sheep had fallen from 2.26 mg. to 1.76 mg.; that of the other from 2.45 to 1.98. This was in confirmation of my previous observations.

During this observational period in both cases the Mg excreted in the urine increased—as was to be expected, but there was less than the *usual* amount in the *fæces*. In one sheep the *total* Mg excretion was reduced by 23 per cent., and a negative Mg balance turned into a positive one. In the other animal the total Mg excreted was slightly increased, the excess being less than the amount in the injection; all this extra Mg appeared in the urine. In both sheep it has been seen the Mg diminished in the blood; yet in No. 1 the excretion was considerably reduced, in No. 2 it remained practically the same.

A second experiment was performed on these sheep. Each received by stomach tube 5 g. $MgSO_4$. The amount administered was deliberately kept small so as to avoid purgation. There was no increase in the amount of fæces passed. The Mg content of the fæces in both cases was increased both relatively and—as was to be expected—absolutely. The Mg in the hay intake of both sheep remained the same, the only additional Mg being the 492 mg. in the $MgSO_4$, yet in one sheep the Mg excretion was increased by 1,000 mg. and in the other by 1,100 mg. The excretion of Mg in the urine remained constant. It would be unwise to dogmatise

on the results of four observations, but the indications so far obtained show that in sheep when Mg is introduced parenterally there is a tendency for it to be stored in the tissues; when it is administered orally its excretion from the body is increased, and in both cases the blood Mg is diminished. It remains to be observed that these sheep, after being kept in metabolism cages for several months on a ration of hay and water, were turned out to grass. Five days later their blood Mg was estimated. In one case the amount was normal, in the other it had fallen to 1.63 mg. This investigation is still proceeding in the laboratories of the Animal Diseases Research Association at Moredun.

In conclusion may I be allowed to summarise what I have put before you. The condition of Pine has been known for more than a century. One of the most prevalent types is due to a deficiency of Fe, and for 20 years it has been recognised that the administration of Fe can prevent or cure it. Pine untreated results in unthriftiness, emaciation and death. Its timely treatment has proved of vast economic value to stockowners in Scotland and other parts of the world, and still greater economies will be effected when the treatment becomes more widely known.

Ca and P deficiency was recognised fully 60 years ago as causing faulty bone formation. It has been shown further that lack of lime will lead to poor coats, unhealthy offspring, an interference with the detoxicating function of the liver, and a poor milk yield. There is evidence that in this country much of the animal stock has too small an intake of these minerals. A *sufficiency* of both Ca and P should be striven for rather than that they be present in any particular ratio.

In lactation tetany or Herefordshire disease a deficiency of Mg is present in the blood, sometimes accompanied by a hypocalcæmia. The parenteral administration of Mg has proved of benefit. The cause of this condition is not yet known. Investigations are actively proceeding towards its elucidation.

I have endeavoured, in presenting this communication, to avoid any unnecessary reference to detailed figures, which are difficult to grasp in the course of a lecture—and thus fail to serve their purpose. I have chosen, therefore, to present the subject in a general manner, and I trust that the story has not suffered too severely from the limitations of time imposed upon me. There are many problems still to be unravelled; there is an open field waiting for exploration; the time is not yet in which to close the gate.

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THE INTERPRETATION OF RADIOGRAPHS OF THE EQUINE PHALANGES.

By V. BERWYN JONES, M.R.C.V.S.

Wonersh, Guildford.

Introduction.

THE following prints illustrate, not only some of the points raised in connection with the interpretation of radiographs of the equine phalanges, but also in some degree the advances made, not only in the technique of veterinary equine radiography, but also in the printing of positives from the original negative obtained.

Formerly it was impossible to present an adequate print of an equine radiograph, not because the detail was not there, for it was easily seen if the radiographic negative was placed in a proper " viewing-box," but one could not publish results with any satisfaction because it seemed impossible to bring out the whole of the picture.

To those veterinary surgeons especially who had never seen an original equine radiograph, such published results conveyed nothing—in fact, they were most damaging to equine radiography, for the text would state that " this and that" were clearly shown, whereas, as published, nothing could be seen.

The whole difficulty, and some difficulty there still is, was to bring out on the print, *i.e.* the positive, the " thin " areas, that is, those tissues such as the toe of the os pedis, early sidebones and ringbones, etc., which are the more easily penetrated by the X-rays.

It is, of course, very easy to radiograph the toe of the os pedis or any other such less dense parts. It is when a complete print is to be made of all the bones of the equine pes that the difficulty arises, because of their greatly varying density.

For instance, when an animal has been radiographed for suspected navicular disease, it is easy to print from that radiographic negative a positive giving a beautiful picture of the navicular bone, but the toe of the os pedis and the pastern joint would not " print out," although they can be clearly seen in the original negative.

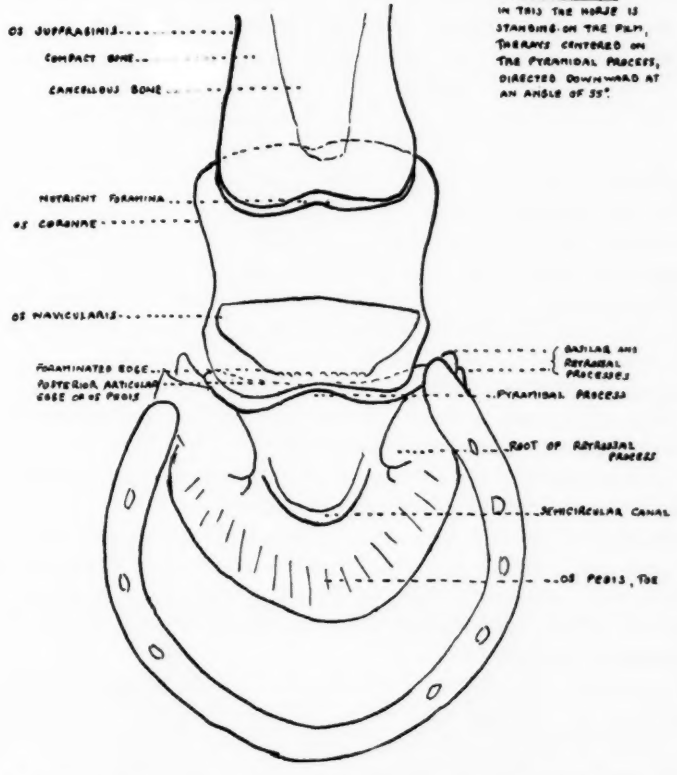
By the courtesy of Messrs. Ilford, Ltd., I was able to collaborate with their technical expert in the printing department, and a method of obtaining some useful (although not perfect) results has been secured. It should be clearly stated that both the original negative and also the positive are quite untouched. It is entirely a question of emulsion speed and light exposure.

Even now it is not possible to adequately print examples of *early* navicular caries (*see* Print E), although I have radiographs of cases, diagnosed by X-rays,

as early as three and six weeks after the inception of lameness, together with the bones obtained post mortem the day after diagnosis.

It can be appreciated that even with the original negative an expert is necessary to " read " such a radiograph.

DIAGRAM OF A RADIOGRAPH OF THE NORMAL EQUINE PHALANGES


A.P. "NAVICULAR" POSITION
IN THIS THE HORSE IS STANDING ON THE FILM, THE RAYS CENTERED ON THE PYRAMIDAL PROCESS, DIRECTED DOWNWARD AT AN ANGLE OF 35°.
OS SUPRASINIS
COMPACT BONE
CANCELLOUS BONE
NUTRIENT FORAMINA
OS CORONAE
OS NAVICULARIS
FORAMINATED EDGE
POSTERIOR ARTICULAR EDGE OF OS PEDIS
DISTAL AND RETRAXIAL PROCESSES
PYRAMIDAL PROCESS
ROOT OF RETRAXIAL PROCESS
SEMICIRCULAR CANAL
OS PEDIS, THE

In the examples printed herewith of navicular disease, a photograph of the bone taken away at post mortem accompanies each radiographic print, so that a comparison may be made.

It may be remarked that all these cases were referred for X-ray, presumably because, clinically, a confident diagnosis was not possible.

If they will in some measure bring home to the practising veterinary surgeon

the enormous utility of X-rays in equine work, I shall be in some degree repaid for the time I have given to this fascinating work.

My acknowledgments are due to the Victor X-Ray Corporation for their unfailing help, and to Major Oxspring, O.B.E., R.A.V.C., for a great deal of useful advice most generously given.

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Before the interpretation of any film is attempted, it is essential that one should obtain a good radiograph.

A good radiograph should contain the minimum of distortion, the maximum of detail without evidence of movement, sufficient contrast to make the detail plainly visible, and that degree of density which will in no way interfere with the maximum of contrast. (Jerman.)

The hall-marks of a good radiograph of the equine pes are : (1) Good definition of the bony contour and outlines ; (2) Trabeculation, and the lines of cancellous structure of the bones must be clearly visible.

If, in an antero-posterior (A.P.) view, the nutrient foramina are clearly visible, then the radiograph probably fulfils the other postulates.

Normally, an exact A.P. view or an exact lateral view, is essential. In fact, at any rate until a high degree of proficiency is acquired, no attempt should be made to " read " any other picture, for distortion will mislead as to pathological significance, normal and abnormal will be confused, and the clinical value of the radiograph rendered valueless.

This preamble is intended to underline the fact that it is not possible to produce a radiograph fit to interpret unless : (1) The X-ray equipment is of adequate power ; (2) a suitable technique is employed to display the bones, or the suspected diseased area, to the best advantage.

In this connection it must be remembered that the face of the navicular bone looks upward and forward to form an angle with the horizontal of about 55 degrees.

Even with a good radiograph there remains the difficulty of ignoring or discounting the shadows cast by the frog and frog clefts, and hoof and heel. In theory, a foot properly prepared for X-ray, by packing up the solar surface and

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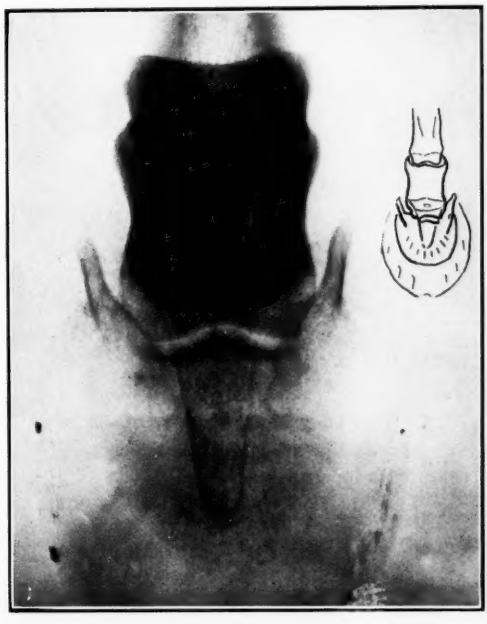

PRINT A appears to be a normal foot; actually it is a very early navicular caries. This is one of the cases that not only cannot be demonstrated in a print, but which require an expert to confidently diagnose. Note how the hoof and nail holes are shown. Note pitfalls Nos. 1, 4 and 9.

(*Article by* V. Berwyn Jones, M.R.C.V.S., *page* 170)

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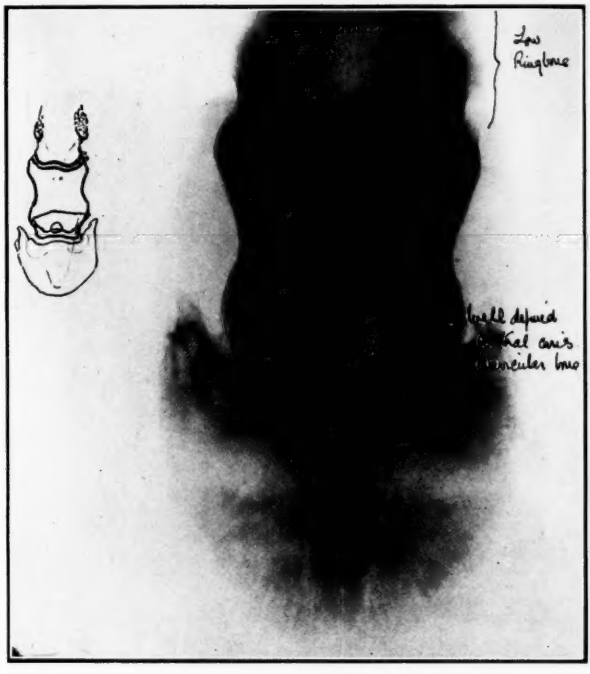
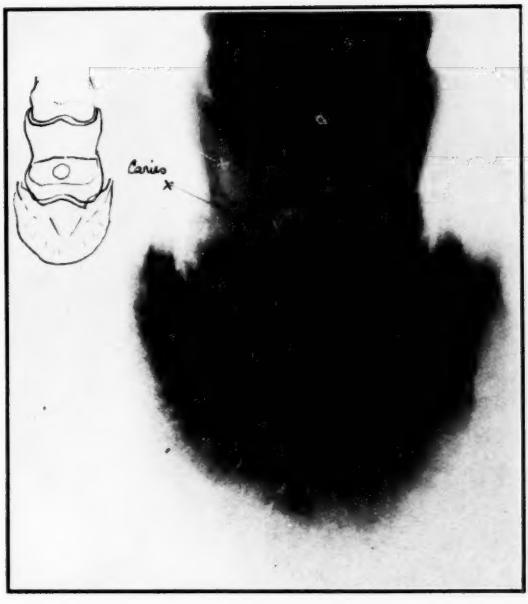


PRINT B. This is of particular interest because the carious area appears to be partly off the navicular bone. The explanation is that the rays penetrate the bone at an angle, and since the negative is not in close opposition to the bone, the "shadow" of the carious area is distorted. Note pitfalls Nos. 1, 2, 3, 5, 10, 12.

(*Article by* V. Berwyn Jones, M.R.C.V.S., *page* 170)



PRINT C demonstrates the great broadening of the navicular bone in an old-standing case with a wide-spreading caries and ostitis. Note pitfalls Nos. 8 and 11.

(*Article by* V. Berwyn Jones, M.R.C.V.S., *page* 170)

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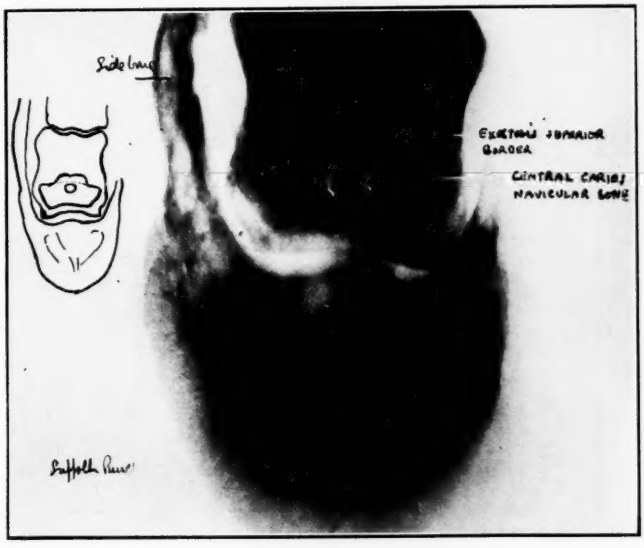
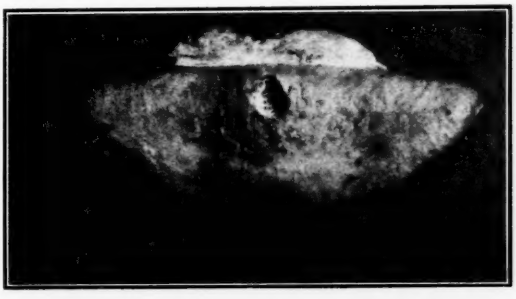


PRINT D shows an unusual exostosis as well as a caries of the navicular bone.



(*Article by* V. Berwyn Jones, M.R.C.V.S., *page* 170)

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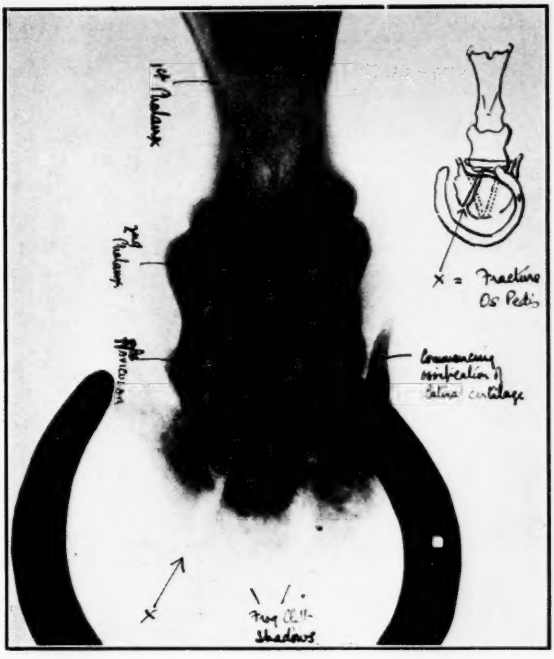
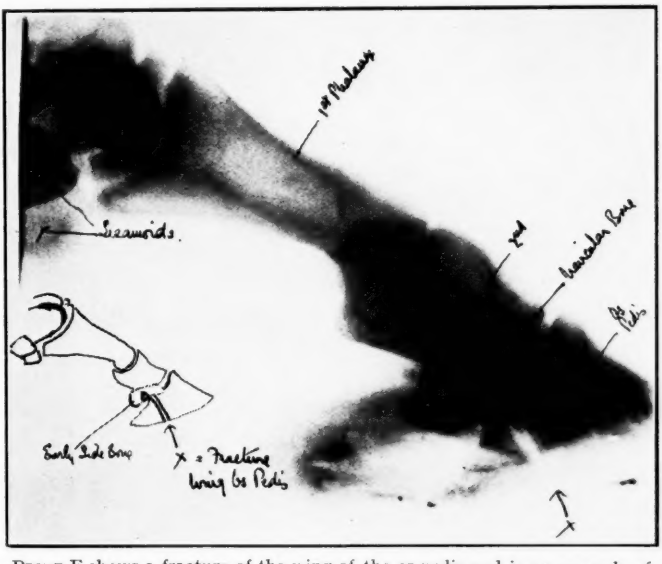


PRINT E. This fracture runs into the articular surface of the os pedis; it was caused by a lorry running over the horse's foot, and is of interest because the animal won a good race twelve months after the injury. Note particularly pitfall No. 1.



PRINT F shows a fracture of the wing of the os pedis and is an example of the necessity of taking a lateral as well as an antero-posterior picture, for in the A.P. view the fracture was not clearly demonstrable. Note pitfalls Nos. 13 and 14.

(*Article by* V. Berwyn Jones, M.R.C.V.S., *page* 170)

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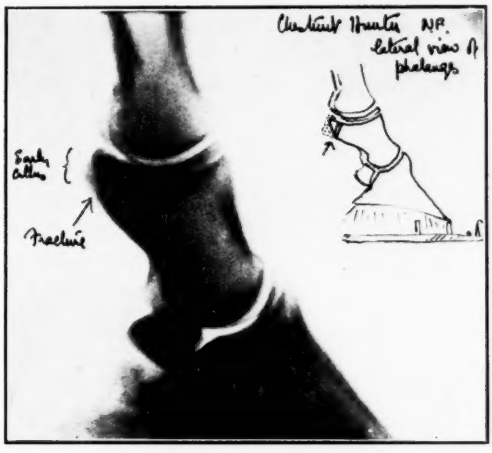
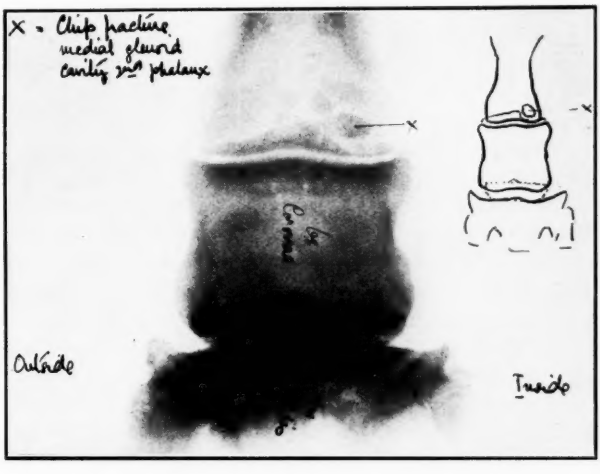


PRINT G illustrates the difficulty in discounting the super-imposition of the tuberosities when a fracture is present.



PRINT H. This is a horizontal A.P. view. A chip fracture of the os coronæ. Note the nutrient foramina (in the "navicular" view they often appear to be *in* the articulation). Note also semi-circular canals and pit-falls Nos. 13 and 14.

(*Article by* V. Berwyn Jones, M.R.C.V.S., *page* 170)

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frog clefts with a hoof horn paste, should not cast any shadows, but in practice one cannot be confident that every crevice is filled.

One must, therefore, study the normal and abnormal, and compare the radiographic views of the bones, together with the corresponding post mortem specimens, before an opinion can be confidently offered as to the presence or absence of disease in any radiograph.

In all the following, the navicular A.P. position and technique is considered to have been adopted unless otherwise stated, and a review is made of some of the pitfalls of X-ray diagnosis of this area.

1. Frog cleft shadow may be mistaken for a fracture line.

2. A fracture os pedis and/or a fracture navicular bone may be confused with a frog cleft shadow.

3. A caries navicular bone may be taken to be a central frog cleft shadow and *vice versa.*

4. The normal " furred " appearance of the pyramidal process of the os pedis has been diagnosed incorrectly as early pyramidal disease.

5. The overlap of the basilar and retrossal processes might be taken to be a pedal ostitis.

6. The foraminated lower edge of the navicular bone might be interpreted to be an ostitis of that edge ; however, an ostitis is unlikely to exist there unless the whole periphery were involved. In all but early cases of navicular disease the bone appears broader than normal, and some alteration of outline, either of contour or definition, or both, is observable, quite apart from the presence or absence of an area or areas of decalcification (shown on the radiographic positive as paler areas) in the body of the bone. Some degree of " furring " or haziness of outline of the superior or lateral borders, but not necessarily indicating an ostitis, is often present, and very often, but by no means invariably, a bony hook or " spur " (Pryer) at the supero-lateral border may be seen. There is something almost indefinable about a true caries shadow that, after some experience, makes it leap to the eye, recognisably distinct from any other. One obtains an impression of depth, which in an early paper on the subject I likened to a crater cavity of the moon. The view attributed to French veterinarians that caries and sidebones cannot co-exist is a fallacy. Ulceration and caries can sometimes be observed in the first and second phalangeal articulation, but there the appearance of depth is not so obvious, and almost certainly an intercurrent arthritis will be present, pointing to disease of the joint.

7. The wing of the os pedis sometimes abuts upon the navicular bone, giving an impression of a fracture, either of that bone or of the second phalanx, or of an ostitis of that edge of the bone ; most unlikely conditions in any case.

8. In the heavy breeds, the thickness of the hoof wall will cast a circular line shadow which will include the wings of the os pedis and the semi-lunar canal.

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9. The heel outline usually crosses the lower end of the first phalanx.

10. The posterior edge of the articular surface of the os pedis gives a definite shadow line immediately under the navicular bone, and nearly corresponding in contour with its lower outline, crossing the lower end of the second phalanx.

11. There is often, especially in aged horses, a shadow, usually symmetrical, on the second phalanx that corresponds with the insertion of the co-lateral ligaments; this must not be confused with a low ringbone. A true low ringbone is a great rarity, and apart from an exostosis caused by direct violence, I have yet to find one existing *per se*. All those cases brought to me as suspected low ringbones have turned out to be cases of navicular disease.

12. Owing to the angle at which the radiograph is taken, the curvatures of the dense articular surface of the os pedis, together with the concavity of the solar surface and the root of the retrossal processes, often appear on the radiograph as symmetrical ovoid shadows, part on the second phalanx and part on the pedal wings; it has been incorrectly suggested that these are shadows of the thickened horn of "corns."

13. In the lateral view the line of the intermediate groove of the proximal surfaces of the phalanges might be taken for a fracture line.

14. Nor must the super-imposition of the lateral condyles and tuberosities be interpreted as exostoses or "ringbones."

In all cases it is a good rule to take two pictures of both feet, for in this way many errors, especially those dependent on faulty technique, may be avoided.

SHEEP-BREEDING EXPERIMENTS AT THE GOVERNMENT STOCK FARM AND AGRICULTURAL STATION OF PALESTINE.

By J. M. SMITH, O.B.E., M.R.C.V.S.

Chief Veterinary Officer, Department of Agriculture and Fisheries, Palestine.

In 1933, two rams and six ewes of the Scotch blackface breed of sheep were acquired with the object of determining whether an early maturing and better quality mutton sheep could be produced by crossing local ewes of Awasi breed with Scotch blackface rams.

(1) In 1933 nine local ewes, and in 1934 eight local ewes, were crossed with the rams, and the resulting half-breds, of which six only survived, were raised under local conditions of sheep husbandry.

(2) It was found that: (*a*) This breed of sheep and its crosses cannot be acclimatised. During the hottest weather of the year they could not keep up with the

local sheep, and while out on pasture were observed to be frequently gasping and lying down to rest. To counteract the effects of the heat, they were shorn and also immersed in cold water, but to no avail. (*b*) The pastures were also found to be too poor to maintain the breed. In this country green grazing is only available for from three to four months in the year; during the remaining months sheep graze on stubble fields and dry grasses. (*c*) The cross-bred lambs developed quite satisfactorily up to the time of weaning, but thereafter they lost condition rapidly, remained stunted, and were very susceptible to pleuro-pneumonia, strongylosis and coccidiosis (internal parasitic diseases). (*d*) The pure Awasi lamb was heavier and stronger at birth than the Scotch blackface × Awasi cross-bred lamb, and thereafter made continuous progress. (*e*) To keep the pure Scotch blackface sheep alive it was necessary to stable them continuously, except during the winter months, and to feed them with green lucerne and concentrates. Despite these conditions some of them died.

(3) In November, 1934, two Dorset horn rams and two Cheviot × Dorset rams were presented to the Government for experimental crossing with local Awasi ewes, with the same object in view as that set out above in respect of Scotch blackface sheep.

(4) Of the two Dorset rams, one died on the 23rd June, before the tupping season, and the other on the 30th December, 1935, from pleuro-pneumonia, and two cross-bred lambs only survived.

(5) It was found that: (*a*) The remaining Dorset horn ram and the Cheviot × Dorset rams were greatly affected during the summer by the heat, and that to keep them alive they had to be stabled continuously and fed on a special diet. (*b*) Unlike the Scotch blackface rams, which had had experience in tupping long-tailed sheep, these rams were unable to tup the local Awasi ewes without an attendant holding the fat tail aside, and even then service was difficult and unsatisfactory. (*c*) The close, short, dense, woolly fleece of these rams retained the heat of mid-summer, making grazing during the day-time quite impossible. To graze sheep at night in this country is absolutely impracticable. (*d*) They are very susceptible to local diseases such as strongylosis and coccidiosis.

Conclusions.

The conclusion to be drawn from the foregoing experiments is that this country is unsuitable for sheep of a non-fat-tail variety. Such varieties of sheep, which have been evolved and bred in a country where regular rainfall produces green grasses in greater or lesser quantities all the year round, are unable to withstand the climatic conditions and survive on dry grazing for the greater part of the year in this country. Furthermore, such sheep and their progeny have no fat-tails to sustain them during periods of drought, and are very susceptible to local diseases.

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Clinical Articles

Castration of Colts.

By RICHARD HUDSON, F.R.C.V.S.
Retford.

THE increase in the number of horses bred during the last few years calls for a consideration of the above operation.

In many districts the operation is performed standing, while in others it is done with the animal cast. Sometimes a local or a general anæsthetic is administered, but often the operation is performed without either, which is a pity, for both are satisfactory, lessening pain and risk of injury, reflecting more credit on the operator and pushing out the so-called professional castrator.

The standing operation is the most popular, particularly with owners.

Standing operators should begin young, and if they have been trained in horsemanship, all the better, for then they are less likely to have fear of the patient. However, with the use of a local anæsthetic it has ceased to be an acrobatic performance, except on very rare occasions, and it is probable that it would be just as acrobatic to cast the animal. I know one man who is 80 this year, and he still operates standing, so there is hope for younger men.

Considered from the aspect of results, I would place the methods employed in the following order, viz.: Clams, cautery, emasculator, ecraseur; but for convenience I place the emasculator first. For the beginner I would place the clam method first. I used them for many years, and the only drawback I found was the need of a second visit and the preparation of clams for use. Satisfactory clams can now be purchased ready dressed, so that objection no longer exists.

The use of the cautery standing is not likely to become popular, because the fire is often wanting or a long way off; otherwise it is a very good method, being painless under small injections of anæsthetic and free from hæmorrhage.

The *Emasculator*—Hausman Dunn pattern—has become very popular, both for the standing and the recumbent operations. It may be regarded as safe, though from what I have seen of some instruments I am thankful that I have one of the early ones.

The *Ecraseur.*—Used standing, the hæmorrhage which follows is often considerable and dangerous, though, strange to remark, when used in the prone position I have not been troubled with hæmorrhage when they have risen.

The *Burdizzo Castrator.*—I don't think it merits consideration for use on colts. Using it on a pony foal, with every chance of a successful performance, it failed to produce any effect, for when I operated on the same animal as a yearling the testicles were perfect.

It was a new instrument and of the largest size.

The standing operation, as performed on a two-year-old shire colt a few days ago, may be taken as an example, for it presented one or two features not uncommonly met with.

The animal had been placed in a loose-box and fasted over night, a procedure I always adopt, because it quietens them, reduces the abdomen and makes them easier to get at. By being haltered ready, one saved time and disturbance. The twitch was applied and the scrotum carefully examined for hernia. No leg strap was used, as I think it inadvisable when the feet have not been handled.

The left testicle was found in position. It was very large, distending the scrotum and had evidently been injured, which was accounted for by the animal having been "romping" fillies. The right testicle could not be felt at first, but on manipulation some part of it was found near the inguinal opening, sufficent to enable it to be injected. I usually find that if I can inject such testicles they can be easily removed.

Using a 10 c.c. syringe and a 3 in. needle, the large testicle was injected with 5 c.c. of 5 per cent. cocaine solution, and the small one with 3 c.c.

The needle enters the gland at the rear and is passed upwards to the epididymis at about its point of union with the tunica vaginalis. When this is reached the testicle is drawn on by the cremastic muscle and that is the best point for injection. Delay of a few minutes allows for instruments to be got ready and placed in a pail half-full of disinfectant solution, and gives the anæsthetic time to act.

Normally, the right testicle is taken first, but in this case the left one was dealt with. Using an ordinary castration knife, the scrotum was freely incised from front to rear, the testicle drawn on to expose the neck of the tunica, this being freely slid upwards. The cord was too thick for complete enclosure in the emasculator, so the two portions were divided with my fingers and crushed separately.

Using a Symes knife, the small testicle was penetrated and the overlying tissues incised. On searching into the wound, epididymis was found and drawn on until the testicle appeared and all was found to be complete before removal. This incision was examined for size, and not being thought large enough to prevent early closure it was enlarged. Hæmorrhage from the cord of the first testicle was abundant, probably owing to its inflamed condition, so it was allowed about five minutes to find out whether it would cease. It did not, and if it had been allowed to continue it would soon have been serious.

Smearing my hand with antiseptic oil (Creolin and Ol. Rapii, 1 in 10) a search was made for the end of the cord in the direction of the inguinal canal opening, and the finding of it was facilitated by the slitting up of the neck of the tunica vaginalis—already done.

The swollen end of the cord was drawn down and the emasculator again placed on and left there while the removed portion was examined. The artery was found to be very large and flabby in its walls. The sort of artery that crushes

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badly and may often give trouble, so to avoid further bleeding a pair of artery forceps was placed on the cord before removal of the emasculator, and left on until the following day.

The wounds were now washed out with antiseptic solution and dressed with the oil.

After-Treatment.—It has always seemed remarkable to me that so little is expected to be done for castration wounds. Wounds in other parts are washed and lotioned and powdered, but in castration, with a wound open to the abdominal cavity, no effort is made to prevent infection.

It would often be useless to suggest that such wounds should be swabbed out, but if it is done, much better results are obtained.

Exercise or turning out to grass should be advised. Many operators turn colts away and do not have them brought in at night. Much depends on the weather. If they are exposed to wet and cold winds, anything may happen. It is the custom with some in my district to smear the loins with lard to prevent the effects of rain.

Housing in a confined space often causes swelling of the scrotum and too early closure of the wounds. A yard is better than a loose-box.

Colts turned out on rich meadow land do not take much exercise, and it should be provided by driving them about. I have known them made to take it by a man on horseback with a hunting crop.

I believe in feeding them well, regarding the operation as a severe tax on the constitution, which it enables them to resist.

Cold wet weather, extreme heat, large quantities of cold drinking-water, standing under trees and hedges in cold winds, are often productive of trouble. Water has often been withheld for several hours before the operation and after it, and while still in a heated condition the colt is often turned out to drink cold water, and drinking freely, suffers shocks which are difficult to explain.

Whatever the method, castration offers many risks. By it many reputations have been made and lost and the opportunities are here again.

Firmness, gentleness and the cocaine injection will do much to enhance that reputation we all seek.

On Turning Out to Grass.

By DAVID ERIC WILKINSON, M.R.C.V.S.
Chigwell, Essex.

In the spring the horse-owner, naturally wishing to cut down stable expenses, looks longingly for suitable pasturage for horses whose work is finished for the time being. Hunters and coal-cartage horses in particular can look forward to a period of rest which may be spent at grass with benefit to animal and owner alike, provided all conditions are favourable.

Before turning horses out to grass, however, it is advisable both for horse-owners and their veterinary advisers to look at the proposition from all angles.

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The state of the weather, the available amount of feed, water and shelter from cold winds and showers, and from blazing sunshine in high summer and autumn, as well as the adaptability of the animal to his changed environment, must all be taken into consideration. Not all horses do well at grass, and whilst some thrive and grow fat, others in the same field lose condition to an alarming degree. Generally speaking, young horses do well at grass; but this does not always apply to old animals, who miss their stable comforts. Horses should never be turned out in any field where they cannot be inspected by a competent observer at least once each day. Many grave accidents may occur in 24 hours, and the horse which has met with a disabling injury is a very helpless animal indeed! Moreover, some horses will not feed at grass. The writer, on one occasion, turned an old van horse out in a good field for a month's rest under the watchful care of a neighbour. This man reported three days later he had never seen the horse even put his nose to the ground, and the horse was brought up to complete his rest in a loose-box just in time to avoid a collapse. Such an instance is admittedly rare, and possibly unique, but one frequently meets with old town horses which have been well fed in good stables which do not seem to like grass feeding at all. The disposition and any especial disabilities of the animal should also be taken into account before turning him out to fend for himself. The writer has under treatment at the present time a polo-pony which has been turned out since last autumn. The lusty condition of others of the same stud shows they have been abundantly fed all the time, but as this pony came up a mere " bag of bones " enquiries were made which showed she was always driven away from the feeding trough by the others. Provision must always be made for the separate feeding or grazing of shy and timid horses if they are to thrive at grass. Great care should always be exercised in turning out horses which are lame, convalescing from lameness or injury or affected by disuse atrophy in any form, including contracted feet. It is often too readily assumed that the continuous exercise during a " run at grass " will benefit these cases, but if such exercise causes any degree of pain or even discomfort the amount voluntarily taken by the patient becomes daily less and less, the atrophy increases, and may be followed by a painful decubitus often with fatal results. This remark applies with increased force to hindleg lameness or atrophy. When assuming a recumbent posture the horse, lame on a hind limb, invariably lies down on the affected member, as the weight is borne by the sound limb until the animal is nearly down, the hock is then flexed and the body weight is let fall on the opposite side. Animals affected by disuse atrophy should be forcibly exercised or put to some suitable light work rather than allowed to aggravate their claudication by complete and prolonged idleness.

The observant practitioner learns from his mistakes, and several such errors on the part of the writer have taught him sharp lessons. Notable was the case of a hackney pony convalescent from a fractured hind pastern which was turned out to grass when union of the fracture was complete. The muscles of the hip and leg were greatly atrophied by prolonged disuse whilst standing in slings, and after being turned out for a week she was found down on the injured side

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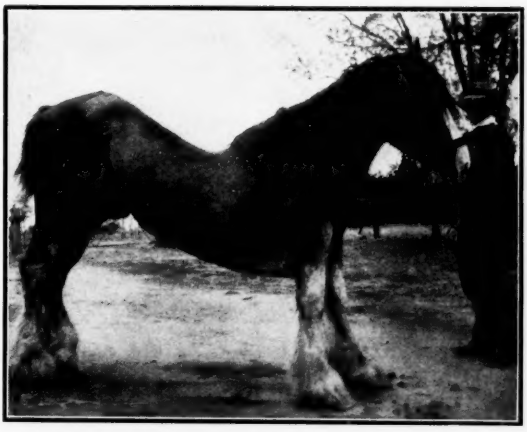
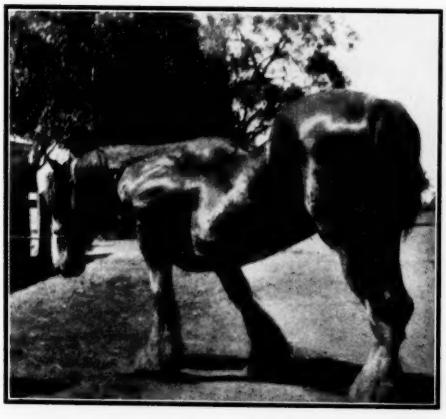
and unable to rise. Luckily the case was reported in time to save her, and her period of idleness was interrupted by three bouts of walking exercise each day in left-handed circles with the wasted off-hind leg on the outer arc of the circle so that this limb took the longest stride. As soon as possible this was followed by trotting exercises, and in three weeks the pony was back at work. Last summer attention was called to a cart-horse sent down from London for a rest at grass. He was lame in both forefeet from subacute laminitis with some tendinitis, and was rapidly getting worse at grass, as after lying for a few hours he got up very stiffly and seemed afraid to put any weight on his feet. He was rapidly losing flesh from pain and hunger, as he was not long enough on his feet to graze sufficiently. Light work on the farm with one feed of oats daily was advised, and after working through the hay and corn harvests, the horse returned to London sound and has been at regular work ever since. Some seven years ago a hunter in the Cattistock country, which had been lame in the near foreleg for 18 months and had missed two hunting seasons, came under the writer's treatment. He was running out at grass as unworkably lame and showed marked atrophy of the muscles of the near shoulder and arm.

As the owner did not wish to bring him up and he was in a small paddock adjoining her house, forced exercise on the lunging rein for 20 minutes in right-handed circles, three times a day, was carried out all through the summer, and effected a complete cure. Similar treatment resulted in a complete cure of a case of knee lameness in a hunter. High splint lameness had set up an acute carpitis with very obstinate lameness, which was only partially relieved by median neurectomy after firing had proved ineffective. The persistent lameness, after neurectomy, was diagnosed as mechanical claudication arising from fibrous adhesions, and these were broken down by daily lunging whilst running out at grass. An amusing feature of this treatment was that the animal eventually learnt to " lunge " himself, and on being called to in the field would trot round his owner in left-handed circles until given some apples or sugar as a reward !

Last spring a blood hunter slipped up at a fence at the Puckeridge Hunt Point-to-Point, spraining his psoæ muscles so badly that his recovery seemed very unlikely. He was rested in a loose-box for six weeks, fomentations and massage, followed by a thick pitch plaster, were applied to his back and loins, and he was then turned out. A month later the pitch plaster had worked off and his gait had improved somewhat, but atrophy of the muscles of the loins and quarters was very marked. Arrangements were then made for him to be caught twice daily, lunged for 10 minutes in alternate directions, and turned loose again. The increase in tone and volume of the wasted muscles was very apparent after a month of this treatment, which was continued until he was brought up to start hunting again. He was regularly hunted with the Zetland all last season, and, in his owner's words, " went like a train."

Physical rest is not necessarily physiological rest, and the writer is convinced that the above quoted cases, together with many similar ones which have come





Clydesdale stallion, two years.

A Case for Diagnosis.

(*Article by* H. B. Ruddock, M.B., B.S., B.V.Sc. (Melb.), *page* **181**)

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under his notice, would have been left permanently useless if merely allowed to "run at grass."

Amongst other items to be considered is that of grazing animals being worried by biting flies and insects. Some horses suffer intensely from these pests whilst others appear to ignore them. Horses with any sores or wounds at grass should be very carefully watched, as they very rapidly get "fly-blown" in hot weather. When practicable it is good practice to bring grazing horses into cool and shady loose-boxes during the daytime, turning them out at night. This is particularly suitable for grazing mares and foals.

A Case for Diagnosis.

By H. B. RUDDOCK, M.B., B.S., B.V.Sc. (Melb.).
Melbourne, Australia.

Subject.—A two-year-old Clydesdale stallion.

Complaint and Duration.—For about a fortnight animal was lying down and could only get up with difficulty.

Past History.—Prior to this illness the stallion had been perfectly fit and was a prizewinner at the Melbourne Show four months previous.

Present Illness.—The stallion was at work, travelling at ordinary walking pace from farm to farm, where his service had been booked. It was noticed that he suddenly became tired and slovenly in gait. His groom took him back, by easy stages, to his stable. During the next few days his illness became more marked. Appetite was lost, thirst increased, bowels costive; at times there was sweating. He spent all his time lying on the ground. He could get up if urged, but would get down again as soon as allowed.

Examination.—The stallion was over 200 miles from Melbourne and was seen on one day only about 14 days after the onset of the illness.

When examined he was lying in his stable. He looked uncomfortable and uneasy, as though he was seriously ill and realised it.

Pulse.—64 beats per min., soft but not weak.

Temperature.—104.4° F.

Respiration.—Increased rate, rather shallow. The animal was made to get up, which he did with a certain amount of difficulty. For about half to one minute he appeared normal, then gradually certain groups of muscles relaxed and he became markedly deformed. The muscle groups affected were the pectorals and the lumbar; as the pectoral muscles relaxed and lengthened his body appeared to slip forward and downwards between the two front legs. His sternum became very prominent and nearer to the ground, his neck became shorter and his chin much closer to his shoulders. Relaxation of the lumbar muscles allowed his back to become extremely arched. The ventral abdominal muscles were apparently not affected, but were tightly contracted in an attempt to compensate for the laxity of the lumbar muscles; this gave a very tucked-up appearance to the

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abdomen and by increasing the intro-abdominal pressure forced out the flank and dorsal portion of abdomen. That is, the dorso-ventral diameter of the abdomen was decreased while the transverse—from side to side—diameter was increased.

Gait.—The stallion could only walk with great difficulty, each step taken by the fore legs appeared as though it had to be carefully planned and then deliberately carried out. It was not unlike the gait one would expect with double shoulder slip. He was then taken back to the stable, which he just managed to reach, much to the relief of the owner.

No sensory nerve change was detected. The photographs give a good idea of the deformity produced by the affected muscles.

SOME CLINICAL NOTES.

By Principal J. J. O'CONNOR, M.R.C.V.S.
The Veterinary College of Ireland.

Tuberculous Pleurisy in a Setter.

Subject.—Red Setter dog, three years old.

History.—Was treated for pneumonia twelve months ago and subsequently improved, according to the owner's statement.

Symptoms.—Severe dyspnœa and emaciated condition. Rough blowing sounds were heard on auscultation. Dullness on percussion in lower part of chest.

Diagnosis.—Tuberculous pleurisy.

Post mortem.—The animal was destroyed by an injection of chloral hydrate into the external saphena vein, which caused immediate collapse; and post mortem examination revealed tuberculous pleurisy with about a pint of fluid in the pleural cavity and tuberculous lesions in the lungs, liver, and one kidney. The interesting feature of the case is that the owner of the dog, a lady, was suffering from tuberculosis of the lungs with hæmoptosis.

Tuberculous Pneumonia in a Fox Terrier.

Subject.—Fox Terrier, four years old, in poor condition.

History.—Said to have been in good health until a week ago.

Symptoms.—Very distressed breathing with the mouth open. It collapsed and died when the chest wall was punctured with a small trocar and cannula.

Post mortem.—Miliary tubercles were found in both lungs, tuberculous lesions were present in the liver, gastric lymphatic glands, spleen, one kidney, and the mesenteric and lymphatic glands. There was no fluid in the chest. A point of interest in this case is the absence of lesions on the pleura with pleural effusion, which are so common in the dog.

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Chronic Abscess in a Pony's Breast, and its Sequel.

Subject.—An aged grey pony, the property of a hawker.

The pony was brought for treatment for large inflammatory swelling on the front of the sternal region. It showed no sign of pointing, but on being punctured deeply with a trocar and cannula, thick pus exuded. It was then opened and evacuated and healed in due course.

Just as it was healed the pony became extremely lame in the near hind limb and showed evidence of febrile disturbance, with a temperature of 106°. The limb was repeatedly examined, but the seat of lameness could not be discovered. The animal put no weight whatever on the limb, and in the stall constantly rested the hip of the affected side against the trevis.

The patient was treated with febrifuge medicine, including sodium salicylate, and although the fever subsided to a certain extent and the animal continued to take a little hay and mash, no improvement in the lameness ensued, and one morning, a week after admission, it was found dead in the stall.

Post mortem examination revealed a collection of creamy pus beneath the muscles on the inside of the femur extending along the bone, almost from the stifle to the hip joint. There was no obvious lesion externally to attract attention, but if this region had been very carefully examined some evidence of the seat of the lameness might have been discovered.

The pus in the lesion was creamy and contained a streptococcus in pure culture.

The strange feature of the case is that although this abscess appeared to be due to metastasis, no other abscess could be found in the body. All the lymphatic glands were normal.

Ascites in a Greyhound.

Subject.—Greyhound bitch, 11 months old on 6th May, 1935, was tapped for ascites, a large quantity of fluid being removed. Was then put on a course of digitalis and nux vomica, and an unfavourable prognosis was given.

The bitch was seen again on 23rd July, in perfect health.

In February, 1936, the patient was brought in again with a renewal of the ascites and was destroyed. The record of the post mortem examination could not be found at the time of writing. Up to this she was in perfect health and won some races on the track since her first attack.

The interesting feature is the apparent good recovery and the delayed recurrence of the condition.

Pelvic Enlargement in a Racehorse.

Subject.—Four-year-old Brown Thoroughbred Gelding, in training and in good condition.

History.—Was castrated in the standing position three weeks ago by a veterinary surgeon. Appeared normal until yesterday when he refused his feed.

Another veterinary surgeon was called in, and a rectal examination found a swelling at the left antero-lateral aspect of the pelvis which he diagnosed as an abscess following castration, and advised sending the horse to the College.

Symptoms.—When the horse arrived the following symptoms were observed :—

(1) Straining as if trying to defecate, without passage of fæces.

(2) Paddling with the hind feet and pawing with the fore feet, and grunting now and again.

(3) Temperature : 101.4°.

On rectal examination it was difficult to get the hand forward into the abdomen owing to the presence of a hard diffuse swelling in the left antero-lateral inferior pelvic region. The swelling was not painful or hot on pressure and palpation.

After a while in the stable the horse became quiet and took a feed.

Treatment.—On the following day cast and anæsthetised the horse as for rig castration, explored the inguinal canal on the affected side and found that the spermatic cord was intact up to the internal inguinal ring. The tumour could be felt with the tips of the fingers from the top of the canal. Pulling on the cord had no effect on the tumour, this being ascertained by an assistant with his hand in the rectum. The abdominal cavity was not opened. Removed about five inches of the cord which was isolated in tracing it towards the abdomen.

The horse recovered from the operation and was put on a course of potassium iodide with sufficient laxative medicine to facilitate defecation. The patient did not evince further pain.

It was decided not to interfere with the tumour in any way.

A fortnight after admission the horse developed laminitis, for which he was treated with ½ gr. of arecoline subcutaneously, and ½ dram of adrenalin over each digital artery in the fore limbs, and by constant hosing of the feet with cold water. Recovery from the laminitis quickly ensued.

Twenty-five days after entry to hospital the swelling was again examined, and it seemed more circumscribed and a hard nodular eminence was felt on its antero-superior aspect.

Examined it again a few days later and the nodular condition had disappeared, but the swelling did not seem to have reduced in area.

The horse was then sent home, and it was reported subsequently that he resumed training and gave no further trouble.

It is a question what the swelling was due to, probably to a collection of fibrin. Operation for the condition was, of course, out of the question.

Sternal Fistula in a Hunter.

Subject.—A Brown Hunter Gelding, four years old.

History.—Three weeks ago the horse took fright when being ridden on the road, and jumped a fence, landing on the sharp stump of a bush on the other side which penetrated the interior part of the chest wall as far as the sternum.

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The wound was treated by a veterinary surgeon, and as it did not seem to be healing the horse was sent to the College.

Symptoms.—There was very little swelling round the wound, and no apparent discharge when the horse arrived, but a probe passed into the wound entered for a distance of about six inches and came in contact with the sternum.

The horse was in a normal healthy condition.

Treatment.—The case was kept under observation for a week with local antiseptic treatment. Then he was cast and anæsthetised in the open on a grass plot and the fistula was opened up.

Two passages were found, one into the muscle with pieces of bush in its depth and another alongside the body of the sternum and extending above it for a considerable distance. The probe entered easily its full length, about nine or ten inches from the level of the skin. A large vessel was severed which bled profusely and was secured by an artery forceps without seeing it, the forceps being left in position with its handles tied together until the next day. The cavity was plugged with six yards of gauze.

The next day the horse was dull and not feeding. It never recovered and died on the 16th day after the operation. Post mortem examination revealed pleurisy and pericarditis

The chest cavity was not perforated but was only protected by the pleural membrane which was grey and necrotic. There was no pus in the chest, but it contained several gallons of clear yellow fluid and a thick layer of fibrinous deposit on the lungs. The pericardium was also distended with fluid and there was a very thick layer of fibrin on the epicardium.

It rained during the time the horse was on the ground and the day was cold, in the month of October ; and the horse probably contracted a chill. The febrile symptoms appeared too suddenly to be caused otherwise.

Traumatic Pleurisy in a Hunter.

Subject.—A Bay Huntress.

History.—Some months ago, when hunting, the mare was staked by the stump of a bush when jumping a fence, causing a wound on the offside of the chest wall just behind the axilla. The wound healed and the mare was turned out to grass. One day she was found in the field affected with severe dyspnœa. She was under the care of a veterinary surgeon for a considerable time, but no improvement occurred ; and although she continued to feed she became emaciated.

The owner was very fond of the animal and had her sent here with a view to getting further treatment.

Symptoms.—When she arrived here the breathing was very distressed and her condition emaciated. She only lived a couple of days.

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Post mortem.—Examination revealed diffuse fibrinous pleurisy with adhesion of the lungs to the chest wall. This was ascribed to a gradual infection from the deep wound in the chest wall. The lungs were not affected.

Traumatic Pleurisy in a Draft Mare.

The animal was injured recently by collision with a motor car, causing a wound on the near thoracic wall just behind the elbow.

The mare was heavy in foal, being due to foal two months hence.

I saw the mare with the veterinary surgeon under whose care she was, and she was then in perfect health and apparently none the worse for the accident. The wound was granulating and we both concluded that it was only a matter of a short time for the wound to heal completely. The foal was alive. Soon afterwards, however, the mare developed pleurisy and died.

Chronic Pleurisy in a Greyhound.

Subject.—A very good greyhound bitch.

History.—Six months previously she was staked by colliding with a sharp branch of a bush in front of the breast. The wound suppurated for four months when a piece of stick came away from the wound. Still it refused to heal.

Symptoms.—When brought to me the bitch was apparently in normal health but very thin. There was a sinus in the situation mentioned. On probing it was found to extend deeply to the inside of the right shoulder joint.

Treatment.—Anæsthetised the animal and opened up the sinus to its depth, exposing the brachial plexus and the first three ribs, expecting to find a foreign body but none was found.

The wound was treated antiseptically afterwards by the owner, but again refused to heal, and some months after the operation she was again brought to the College in an almost emaciated condition, when she was destroyed.

Post mortem.—Examination revealed that the sinus extended into the right chest cavity where there was evidence of local chronic pleurisy with adhesion of the lung to the chest wall. This condition had, evidently, been present for months, and accounted for the wound refusing to heal.

Typical Malignant Pustule (Anthrax) in a Dog.

By G. F. ELLIOTT, M.R.C.V.S., *District Veterinary Officer*
AND
H. S. PURCHASE, F.R.C.V.S., *Acting Veterinary Research Officer, Mazabuka, Northern Rhodesia.*

The subject was a wire-haired terrier, aged one year.

History.—The dog was brought to one of us (E.), as it was definitely off colour.

Examination.—The temperature was 104° F. and the visible mucous membranes were anæmic.

An irregular, yet circumscribed, plaque-like swelling, approximately two inches in diameter, with a slightly depressed centre, was present immediately behind the point of the left shoulder. This swelling was hard and painful. There was no history of injury, and a very careful examination failed to reveal any puncture or other evidence of a sting or bite.

Treatment.—The indefinite history and nature of the illness was puzzling, and symptomatic treatment only was prescribed. Two grains of cascara sagrada were given as an evacuant and hot fomentations to be applied on the swelling were advised.

The following day the owner informed one of us (E.) that the dog was very much worse. At 2 p.m. the dog was *in extremis* and a very considerable alteration had taken place in the swelling. The skin over the swelling was now hairless and of a very angry purple colour. A diffuse doughy œdematous swelling was extensively spread over a large area of the thorax and abdomen. This extensive infiltration rather suggested an atypical case of snake-bite. The animal died whilst being examined.

Post mortem Findings.—Examination of the affected area revealed extensive œdema. Around the centre and just under the skin there was a slight hæmorrhagic discoloration, but the rest of the fluid was colourless "serum." This œdema extended to the foot of the affected leg and from the neck to the hip on the left side.

Microscopic examination of the œdema fluid and also of the blood from the auricular vein revealed *B. anthracis.*

Discussion.—This was a typical case of "Malignant Pustule" with, later, generalisation and death. It is almost certain that the causative organism gained access by a superficial injury. It is noteworthy that there was no history or proof that the infection was due to ingestion of infected meat or other food stuff. The outbreak of anthrax in hounds described by Wright (1936)* was apparently due to ingestion of "knacker meat." This author also refers to "swellings in the throat, some of the lips, and on various places on the head." It is not possible from his description to tell if these swellings were in the nature of "Malignant Pustules."

Some Cattle Notes.

By CLIVE POTT.

Royal Veterinary College, London.

The following cases came under notice in the practice of Mr. D. E. Wilkinson, M.R.C.V.S., Chigwell.

On 29th December last, attention was called to an aged Jersey cow due to calve, the stockman complaining that this cow, which he had been unable to "dry off," was passing blood in the milk. As the milk appeared otherwise normal, and the cow had been milking heavily for over 12 months, it was thought possible

* Wright, A. J. (1936): *Vet. Rec.*, Vol. XVI, p. 243.

that the hæmorrhage might be associated with a hypocalcæmia, and a treatment was adopted consisting of the hypodermic injection of calcium borogluconate, 2 ounces, dissolved in hot water, 12 ounces. This to be followed by 1-drachm doses of liquor formaldehydi in 1½ pints of cold water three times a day.

Early next morning the owner telephoned to report that the cow had calved in the night and was " down " with milk fever. On visiting the cow at 8 a.m. she was found comatose and prone on her left side. The calcium injection was repeated, the cow warmly rugged and propped upon her chest. By noon the patient was conscious, the surface of the skin warm, and she had drunk a little water.

In the evening, as the condition was unchanged, the calcium injection was repeated. The udder was not inflated and the stockman was forbidden to milk her.

Next morning, 31st December, the cow was still down, but was feeding, drinking water and chewing her cud, but the bowels were inactive. Treatment consisting of massage and a hypodermic injection of acetylcholine (5 c.c.). This was repeated in the evening and next morning the cow was up, feeding and ruminating normally, the bowels acting freely. Further progress was uninterrupted.

On 9th April a message was received to attend a shorthorn heifer which was calving. Examination revealed a breach presentation, with the hocks jammed under the brim of the maternal pelvis and the feet directed downwards.

From the absence of labour and from the clots of blood in the vagina, my principal suspected some uterine injury. The fœtus was pushed forward with the repeller, the fœtal hocks were then extended whilst the feet were held in the palm of the hand in order to prevent injury to the uterus. They were then carefully brought into the birth passage, and the calf was delivered by traction with very little difficulty.

No hæmorrhage followed delivery, but the heifer appeared considerably distressed, and the stockman reported that he had heard her moaning on the previous evening, but had not seen her strain. Next morning she was very collapsed and cold, dying during the day.

No autopsy was made, but the knackerman reported large blood clots being found in the abdominal cavity, and it is surmised that the calf, a large one, thrust its feet through the floor of the uterus during early labour pains.

A Fœtal Abnormality.

By OSCAR OTTAWAY, M.R.C.V.S.

Demonstrator, Department of Anatomy, the Royal Veterinary College.

Subject.—Two days old six-legged lamb ; female.

The vulva in the normal pelvis connected directly with the right ureter, which led up to the right kidney. The right kidney was in the normal position.

The left kidney was wedged in the extra pelvis, the ureter passing forwards to a huge bladder containing from half to one pint of urine. This bladder (the

left) was connected to an extra bladder (the right) of almost the same size; but both had a common urethra which opened into the vulva above the left kidney in the abnormal pelvis.

There was no connection between the right bladder and the right ureter, all urine from this bladder passing into the common urethra and out of the extra vulva.

The intestines were as follows:—

Right side: Rumen, reticulum, omasum and abomasum connected with duodenum, small intestine and cæcum as usual. From the cæcum there was an extra small intestine, which opened directly into the anus in the normal pelvis.

Left side: From the small intestine on the right side, about midway between the stomach and the cæcum, a fork of small intestine extended across to the left. This led into a huge cæcum, was continued as large colon, then small colon to open normally into the anus in the extra pelvis.

The extra pelvis was half the size of the normal one, and was constricted across its centre. The left angle of the haunch of the normal pelvis was fused to the right angle of the haunch of the extra pelvis.

The muscles of the normal hind limbs were well developed as compared with those of the extra limb.

The contents of the chest, and all other structures, were normal. The remnants of the fœtal structures being particularly well developed.

Abstracts of Current Literature

Artificial Insemination of Sheep. By R. M. C. Gunn, B.Sc. (Agric.), M.R.C.V.S. Bulletin 94, "Fertility in Sheep." Commonwealth of Australia.

General.

Only a small number of merino ewes was used in our experiments on artificial insemination, but the main shortcoming was the low percentage fertility experienced; this was probably due to not selecting the ideal period of œstrum for insemination. Quinlan and others (40), (132), (134), have shown that the duration of œstrum in merino ewes varies from 24 to 96 hours, that ovulation usually occurs towards the end of œstrum, and that spermatozoa only survive for a short time in the ewe's genital tract. Marshall and Hammond (96) give the duration of œstrum as 3 to 51 hours with an average of 27 hours. Popa (129) states that the longevity of spermatozoa in the female genital tract is not usually longer than 24 hours. In our experiments ewes could be selected as being on heat only by choosing those which would stand to an aproned teaser ram, a method which, according to Polovtzeva and Fomenko (126), results in the selection of

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those in varied stages of œstrum. In a few cases ewes picked indiscriminately from the flock (and not necessarily showing any signs of heat) were inseminated. Examination of vaginal smears prior to injection was unreliable, as was the experience of Casida and McKenzie (21) and of Cole and Miller (26). The macroscopic appearance of the secretion in the vaginal fornix was noted in all cases, but its value in determining the stage of the œstral cycle was small; in the majority of ewes on heat, it was clear and mucoid, but it varied from thick, pasty, muco-purulent, through very copious fluid mucoid (probably expressed from the uterus on inserting the vaginal speculum), to sparse, thin, watery.

Although the difficulty of penetrating the lumen of the ewe's sinuous cervix, with its four or five long, annular, backward-projecting, tongue-like folds, was well realised, an attempt was made, using a long, tubular lighted, vaginal speculum and a syringe with a long nozzle to inject India ink solution into the body of the uterus. It was found, however, either impossible to penetrate the cervical canal beyond the third last fold, or that the nozzle pierced the wall and that the injection entered the peritoneal cavity. Therefore the nozzle was passed as far into the lumen as possible (usually 1 to 2 cms.), and, though in some cases the wall was undoubtedly pierced and some of the semen deposited within the peritoneal cavity, no deleterious effects were observed. Grant (50) considers it impossible to introduce any instrument into the ewe's uterus by way of the cervix. Walton (169) points out the difficulty in penetrating the lumen of the cervix, and reports that the Russian workers recommend injecting semen into the cervix only to a depth of about 1 cm., because, for one reason, if injected into the body of the uterus, it may cause pain or even convulsions. We doubt, however, that such deeper injections ever reached the lumen of the body of the uterus, though most likely the wall of the cervix was penetrated (as occurred in our India ink injections), and we consider that probably the injected semen, in their cases contaminated with bacteria, produced some local peritonitis which was the cause of the pain or convulsions. The Russian writers in general, when referring to injections into the uterus, may really mean into the caudal part of the cervical canal. They claim that such injections result in a much greater percentage of conceptions than do injections into the vagina alone (169), and that a much smaller volume of semen to produce a corresponding percentage fertility is required.

The above special speculum (in various sizes) was designed and constructed by us, because expanding specula and those depending on a polished internal surface for reflecting light transmitted from a head-lamp or mirror were found unsuitable. Electric leads from a 3½-volt battery, after passing through a variable resistance, are conveyed in a fine insulated metal tube fixed inside the speculum to a small 3-volt lamp bulb situated at the front end of the speculum. It has been found that it is preferable to have the lamp bulb on the upper side of the wall of the speculum, in order to avoid soiling the globe with mucus which tends to collect on the lower edge on inserting the instrument into the ewe's vagina. Leur syringes, with long (preferably glass) nozzles, or special (human) uterine syringes with similar nozzles, are used for the injection.

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Sterilised glass syringes with nickelled brass fittings were used by us, though Russian workers (Walton (169)) find syringes with metal parts unsuitable, as metallic oxidation has a very toxic effect on spermatozoa, and therefore recommend a glass syringe with a glass or ebonite nozzle 20 to 25 cms. long. On the other hand, we consider a glass nozzle, being easily broken, has obvious disadvantages, while ebonite and rubber have been shown by Elshin (36) to be detrimental to spermatozoal life.

On account of our imperfect means of storage* of the ejacula used for actual insemination—the experiments were carried out in a country district—the temperature of storage which was aimed at, namely, 4 deg. C., was not constantly maintained, and ejacula were at times exposed in the refrigerator to as high temperatures as 8 deg. C., and to as low temperatures as —5 deg. C. Nevertheless, Iwanoff, quoted by Wolf (178), says that spermatozoa after freezing to 15 —deg. C., when thawed, may still show feeble motility, and other workers (page 79) recommend storage above 4 deg. C. In some of our cases ejacula were stored at room temperature (18 deg. C.) for as long as six hours prior to their use for insemination.

Our dilutions were made with physiological normal saline solution and just prior to use.

The rams supplying the semen were mainly aged and had been previously sexually rested for several weeks or months.

Only 150 ewes were employed in our experiments, and these were divided into three groups :—

(1) A small control group, each of which was allowed only one service by a ram.

(2) A small group inseminated with a ram's ejaculum collected from the vagina of a ewe which had been just recently served.

(3) A larger group inseminated with artificially-induced ejacula stored for short periods and variously diluted.

The Results.

The fertility obtained in the groups is shown in the following Table.

FERTILITY IN THE THREE GROUPS.

Means of Fecundation	Number of Ewes in the Group	Number of Ewes giving Birth to Lambs	Sex of Progeny Male	Sex of Progeny Female
A single service by a ram	7 ...	3 ...	1 ...	2
Inseminated with semen collected from the vagina of a recently served ewe ...	14 ...	2 ...	2 ...	...
Inseminated with artificially induced ejacula, stored and diluted	129 ...	11 ...	6 ...	5
Total ...	150 ...	16 ...	9 ...	7

* An " Icyball " refrigerator was employed.

This low fertility is not so remarkable, when one considers that only a single service or only a single insemination was employed in each case. Quinlan (133) finds that single hand-service of ewes results in more than 26 per cent. lower fertility than flock service, where each ewe may be served many times during a heat period. The normal percentage fertility of the flock from which the ewes used in our experiments came was rather low, as is quite common in Australian merino flocks (31). Iwanoff (68) finds that, though several inseminations of mares on heat result in up to 90 per cent. fertility, single inseminations give only 25 per cent. McKenzie and Phillips (101) found much decreased percentage fertility in ewes served during the first 14 hours of œstrum compared with that of ewes served after the 14th hour. Polovtzeva and Fomenko (126) obtained the highest percentage fertility in ewes inseminated only in the pro-œstrus-œstrus period. Walton (169) points out the probable greater effectiveness of insemination carried out just before ovulation and stresses the necessity of insemination being repeated; even under ideal circumstances 66 per cent. fertility in sheep following insemination is apparently considered good. That our method of selecting ewes (in regard to their stage of œstrum) was largely responsible for the low fertility, is suggested by the fact that, of 11 ewes chosen indiscriminately and inseminated, three were fertilised and later dropped lambs. Admitting that the fertility in all groups is low, that of the group of ewes artificially inseminated is scarcely comparable to the others, since the ejaculum in all these cases was stored for four to six hours or even more before use. However, the percentages given by Demidenko and others (32) agree with ours in showing lower fertility following the use of diluted semen than of whole semen, and lower fertility following artificial insemination than after natural mating.

No departure from the normal in size, conformation, etc., was observed in any of the progeny.

Factors Compatible with Impregnation.

The main purpose of our experiment was not to ascertain the relative fertility of the various groups, but to determine whether insemination with artificially-produced ejacula would result in conception.

Storage of ejacula for 24 hours at temperatures as low as −5 deg. C., storage for six hours at temperatures as high as 18 deg. C., also storage for two hours at 18 deg. C., followed by a further 30 hours at 6 deg. C. (a total of 32 hours) were all compatible with fertility; the last was the longest period of storage we attempted. As great a percentage fertility followed insemination with ejacula stored for 28 hours at 6 deg. C. as with comparatively fresh ejacula used four to six hours after collection.

Motility of the spermatozoa, as low as " motile " in our scale, was also found to be compatible with subsequent fertilisation.

Dilution, up to one in seven of saline and using as little as one twenty-first part of a single ejaculum, did not prevent impregnation.

Insemination with one-fourteenth of the total volume of an amber (urine-

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contaminated) ejaculum, which had been stored for 27 hours and then diluted with equal parts of saline, was successful.

Though most of the ejacula which resulted in conception were thick creamy, some contained considerable proportions of watery material (the accessory secretions). Most were alkaline in reaction, but one was acid (after storage for six hours at 18 deg. C.), and was fertile.

The sexes of the progeny resulting from insemination with alkaline semen were exactly equally divided. The one lamb resulting from an acid ejaculum was a male. Unterberger (165) has suggested that the pH of semen is of importance in sex determination, because he found that, in man, alkalinity of semen and of the vagina, whether natural or artificial, resulted in a great preponderance of males. Our results give no support to this.

Discussion.—General.

The value of an easy and practical method of obtaining normal semen free from bacterial or other contamination is well recognised, Götze (49) considers that, to be ideal, collection should be simple and capable of being made without contamination, without loss of semen, and without ill-effects on the donor or on the spermatozoa. Our method, it is considered, fulfils these requirements. Greater numbers of spermatozoa may be collected by the application of our method than from natural copulation. If it is a fact, as stated by Quinlan (132) (135), that the vaginal secretions have a harmful effect on spermatozoal life (not confirmed by our tests " in vitro "—*see* page 101), the spermatozoa obtained by our method should survive longer outside the animal body, and hence be more suitable for artificial insemination than those collected from the vagina following natural copulation. Since contact with rubber and ebonite is detrimental to spermatozoal life (Elshin (36)), our method of collection is preferable to those in which these materials are used.

The Wide Application of the Method.

There are many circumstances under which an ejaculum having the characters of that produced by electrical stimulation may be desirable. For example :—

(i) In the artificial insemination of females.—Moskovits (120) recommends it for the production of hybrids of species which will not normally breed, for the inter-breeding of different sized animals, for the breeding of wild animals in captivity, for the prevention of the spread of genital diseases, for the purpose of avoiding the necessity of maintaining numerous males in monogamous species (foxes, etc.), and for the prevention of unnecessary waste of semen by its subdivision to enable the best and widest use being made of valuable sires. Additional advantages are a greater certainty of impregnation, and being able to use special semen on females situated long distances from desired sires. Darling (31) anticipates that " in Australia's sheep-breeding industry we may expect to see considerable use made in the future of the technique of artificial insemination."

(ii) In the determination of the sexual ability of a sire.—In almost all other

methods of collecting semen, an essential feature is a desire to copulate, not always present in the male to be tested. By obtaining an uncontaminated sample the pH and reaction to indicators may be determined, as well as the number and the morphology of the spermatozoa, together with the percentage and degree of their motility and their longevity.

Attempts to evolve a method whereby the spermatozoa from one testis and epididymis together with the secretions of the accessory sex glands might be collected separately have been made without success; local anæsthesia and the application of a clamp to one cord have not prevented emission of spermatozoa.

The progress of developing sterility and the recovery therefrom have been followed in rams by the examination of frequently-induced ejacula; in one particular case, inflammation resulted in the almost immediate disappearance of normal spermatozoa from his ejacula, but regeneration of the testicular epithelium (subsequently demonstrated by histological examination) was followed by slow return of spermatozoa which showed typical motility. In this case, Lagerhöf's (80) observations of the rapid production of effects on spermatozoa on first applying a cause, and the slow reappearance of normal spermatozoa after its removal, has been confirmed.

The method has been applied to rams reputed to be sterile and to some rejected because of old age. In every case it has been possible to obtain an ejaculum containing spermatozoa. In rams proved impotent under careful experimental conditions, abnormalities in the morphology of many spermatozoa were found and ascribed as the cause of the impotence.

(iii) When infection of the testes with bacilli such as those causing contagious abortion is suspected, the method would be valuable in obtaining semen for examination.

(iv) The method can be employed for experimental study of contraceptives, and has already been used by us for this purpose.

(v) In physiological and clinical research on the functions of the testis, the effects of drugs, etc., etc., the method should prove most valuable, for many investigations may be conducted without sacrificing the animals.

(vi) The method has been successfully applied to a number of animals other than rams. Ejaculation has always been readily effected in goats, rabbits, and guinea pigs, but though spermatozoa have been collected in this way from dogs (*see* page 18), they have always been few in number and the ejacula contaminated with urine. We have only tested the method once on a stallion and once on a bull, in neither case succeeding in inducing ejaculation, probably because of technical difficulties. The application of the method to other genera, therefore, requires further investigation.

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Correspondence

BRITISH LIVESTOCK EXPORT TO AUSTRALIA.

To the Editor of THE VETERINARY JOURNAL

SIR,—Some time ago I called attention to the great expense incurred in shipping British pedigree stock for overseas. It is gratifying to note that an important arrangement has been made by the Council of the Royal Agricultural Society of England. "Financial assistance in the form of a contribution towards the expenses incurred in the importation of animals is to be afforded by Australian interests. The shipping companies have agreed that in place of the freight rates usually applied, they will charge only out-of-pocket expenses incurred in the provision of stalls, water, etc., and in loading and unloading the animals. These out-of-pocket expenses will be thirty guineas in the case of cattle, ten guineas for sheep and goats, and six guineas for pigs. All expenses connected with the transport of the stock from the port of export in the United Kingdom will be borne in the following proportions: two-fifths by the importer, two-fifths by the Commonwealth and State Governments concerned in equal proportions, and one-fifth by the Commonwealth Bank, subject to review after June 30th, 1936. The scheme will apply only to animals for which a certificate of full registration by a recognised stud or breed society is furnished, together with the vendor's certificate of breeding and production record."

It is to be hoped that this scheme will give a stimulus to the export trade.

I am, Sir, yours faithfully, T. D. YOUNG.

News

IMPENDING RETIREMENT OF THE PRINCIPAL OF THE ROYAL VETERINARY COLLEGE.

THE impending retirement of Sir Frederick Hobday, through reaching the age limit, is causing the Governors to be confronted with the all-important task of selecting a successor to Sir Frederick at a very critical time in the history of the veterinary profession. The new Principal will have to take over the new College buildings, which will be completed during the next year, and be responsible for their equipment and staffing. On his powers of organisation and of administration will turn to a very large extent the efficiency of the veterinary profession in future years.

The Governors are seeking a new Charter from the Privy Council, under which will be formed a new Court of Governors and a new Council. This new governing body will have no easy initial task in making the appointment of a Principal. In order that the change over may be gradual, Sir Frederick will remain, we understand, in office until the opening of the new buildings, but will go on leave as from October 1st next, in order that his successor may be responsible for the organisation of the buildings which will be under his control in future. The Governors have felt that Sir Frederick Hobday's official connection with the College should not be terminated until the new buildings, for the erection of which he has worked so hard and successfully, were completed and formally opened. We understand that large sums are still needed for their completion, equipment, and endowment.

ROYAL VETERINARY COLLEGE—JOHN JEYES' MEMORIAL SCHOLARSHIP.

A SCHOLARSHIP to the annual value of £100 has been very kindly given to graduates of not more than ten years' standing who have been students at the Royal Veterinary College, London. It may be used for maintenance, meeting the expenses of work, or for travel—either at home or abroad. Applications should be addressed to the Principal, Royal Veterinary College, London, so as to reach him not later than Saturday, June 6th. Applicants should give full particulars regarding the subject to be studied and the way in which they propose to study.

Personal

CONGRATULATIONS to Dr. Amoroso on being awarded the McArdle Medal of the University of Ireland for Surgery—the result of open competition.

PRINCIPAL and Mrs. O'Connor were the recipients of a very handsome silver tea and coffee service at a ceremony inaugurated by the Members of the Veterinary Medical Association of Ireland during this month, as a mark of their respect and pleasure at the appointment of Professor O'Connor to the Principalship of the Veterinary College of Ireland; and also to the fact that he had been Secretary for some years to the Association.

PORTRAIT PRESENTATIONS TO THE PRINCIPALS OF THE ROYAL (DICK) VETERINARY COLLEGE, EDINBURGH, AND OF THE ROYAL VETERINARY COLLEGE, LONDON.—At the present moment two appeals are being made amongst the members of the profession for subscription lists to commemorate the services of Principals Dr. Charnock Bradley and Sir Frederick Hobday, respectively. To Dr. Bradley on the occasion of his having completed 25 years as Principal of the Royal (Dick) Veterinary College, Edinburgh, and to Sir Frederick Hobday on his impending retirement from the Principalship of the Royal Veterinary College, London. Their services are too well known to need recapitulation here, and it is proposed to present each with his portrait in oils. In the case of Principal Bradley, subscriptions have to be sent to Mr. A. C. Doull, C.A., the Secretary of the Royal (Dick) Veterinary College, Edinburgh, who has agreed to act as treasurer to the Fund; and, in the case of Sir Frederick Hobday's presentation, Professor McCunn, Royal Veterinary College, London, and Major Hamilton Kirk, 658, Finchley Road, N.W.11, are the joint treasurers.

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